Michigan Zoonotic & Vector-Borne Disease
Surveillance Summary

Tick-Borne Disease including Lyme disease

165

There were 165 confirmed and probable cases of Lyme disease reported in 2013, an increase of nearly 66% from 2012.

50%

Half of cases with a reported onset date occurred by mid-July. This peak of cases coincides with the activity of the poppy-seed sized nymphal stage tick.

24 to 48

Removing ticks within 24 to 48 hours of attachment greatly reduces the risk of contracting Lyme disease.

Lyme disease continues to be the most commonly reported vector-borne disease in the United States; over 30,000 cases were reported nationally in 2012[1]. In the U.S. cases tend to be geographically focused in the northeastern and north-central United States, but Lyme disease is also endemic and expanding in Michigan. In 2013, 165 human cases were reported with most Michigan exposures occurring in the Upper Peninsula and western Lower Michigan.

The tick vector, *Ixodes scapularis* (Blacklegged tick), is now endemic in the western Lower Peninsula along Lake Michigan, and the highest tick populations occur among coastal communities. Although rare, *I. scapularis* is also responsible for transmitting other diseases to humans including anaplasmosis, Babesiosis and a recently discovered novel Ehrlichia species (see special projects report) in Michigan.

In 2013, MDCH staff conducted human case surveillance, tick field investigations, and surveys of the public, recreational parks staff, and physicians. In 2014 staff will continue to conduct completeness reviews of Lyme disease case follow-up investigations and report annual findings to the public. Additionally, MDCH plans to continue field ecologic surveillance for blacklegged ticks in the state with the help of its partners, including Michigan State University, Michigan's Departments of Natural Resources, and Agriculture and Rural Development. Educational materials will continue to be updated and made available to the public via the MDCH "Emerging Diseases" Website.

www.michigan.gov/emergingdiseases

[1]Source: CDC Reported cases of Lyme disease by state or locality, 2003-2012.

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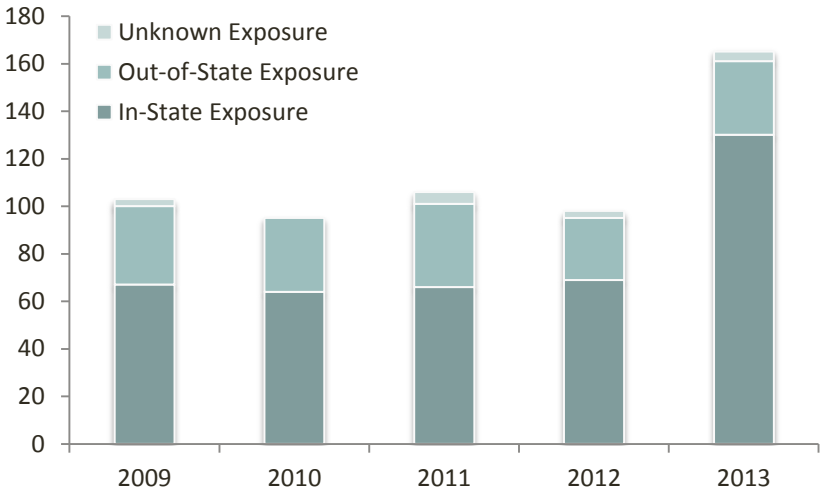
Division of Communicable Disease
Zoonotic Disease and Special Projects Section

Michigan Department of Community Health
MDCH

2013 Lyme Disease Data

Michigan Lyme Disease Cases by Year, 2009--2013

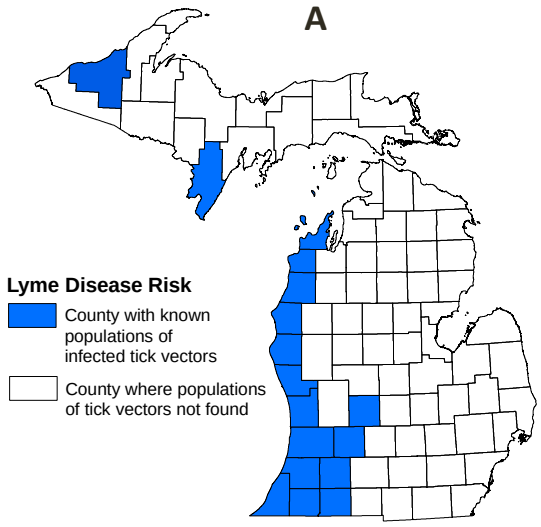


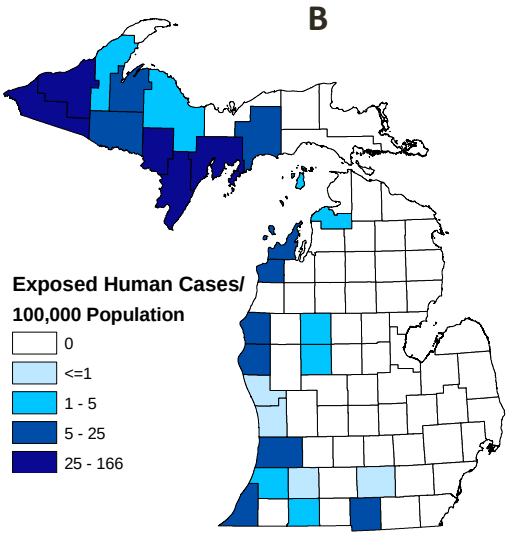
- A total of 165 probable and confirmed cases were reported to MDCH in 2013, an increase of almost 60%.
- One hundred thirty patients reported potential exposure in Michigan.
- The incidence rate in Michigan for 2013 was 1.32 cases per 100,000 persons.
- Incidence rates for 2013 differ between the Upper Peninsula (28.46 cases per 100,000 persons) and the western Lower Peninsula (1.83 cases per 100,000 persons).

The maps at right highlight Michigan counties by Lyme disease human case incidence and potential risk based on known populations of vectors.

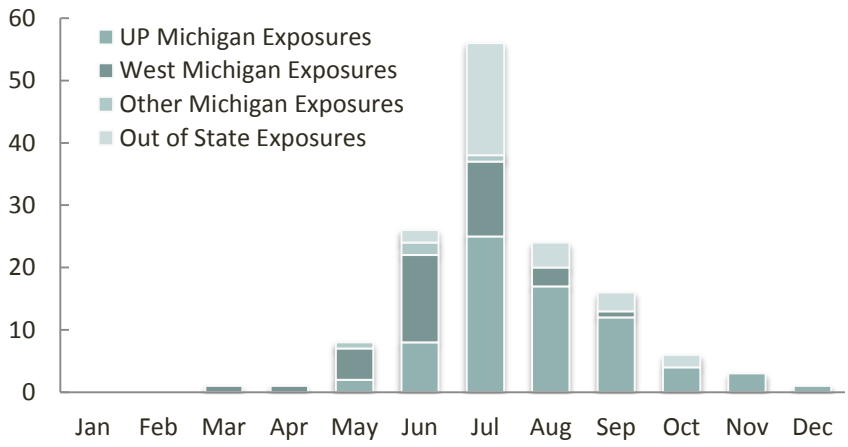
A) Counties with blacklegged tick populations identified by field researchers.

B) Incidence of locally exposed Lyme disease cases (ie. cases exposed in county that is shaded) in 2013.





MI Lyme Disease Cases by month of onset, 2013



Human case onset dates coincide with tick activity:

Adult ticks often have the highest infection rate and are active in the early-spring and the fall, generally at temperatures above 45°F. Because of their large size they are more easily detected.

Nymphal ticks are responsible for a majority of human Lyme disease due to their small size (difficult to notice and remove promptly) and are active during the warmer months (May-August) when people are recreating and working outdoors.

Special Projects

A Novel Pathogen: *Ehrlichia muris*-like (EML)

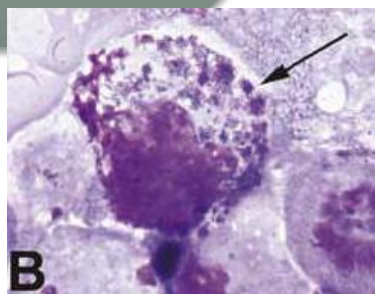
Ehrlichia muris-like (EML) disease was identified in a Michigan patient in 2013. While it was not-confirmed that the patient was exposed in Michigan, evidence points to significant tick exposure locally in the Upper Peninsula.

EML was first discovered in 2009 in Wisconsin and is considered an emerging tick-borne disease in the Upper Midwest. The tick vector for the EML organism is *Ixodes scapularis* (the blacklegged or deer tick). *Ehrlichia muris*-like disease is related to another emerging tick-borne disease in Michigan transmitted by the blacklegged tick called anaplasmosis.

Physicians in regions where blacklegged ticks are common in Michigan should be aware of the potential for EML or Anaplasmosis illness in their area. Symptoms may occur from one to three weeks after tick bite. Some individuals may experience only mild symptoms, or remain asymptomatic. Most patients, however, will experience fever, headache, chills, malaise, and muscle pain. Less frequent symptoms may include nausea/vomiting/diarrhea, confusion, conjunctival injection, rash (in up to 60% of children, less than 30% of adults), joint pain, or rigors.

If not treated, anaplasmosis and ehrlichiosis can result in serious illness, and can occasionally be fatal. Signs of severe illness may include difficulty breathing, hemorrhage, renal failure, or neurologic manifestations. Ehrlichiosis tends to be more severe than anaplasmosis.

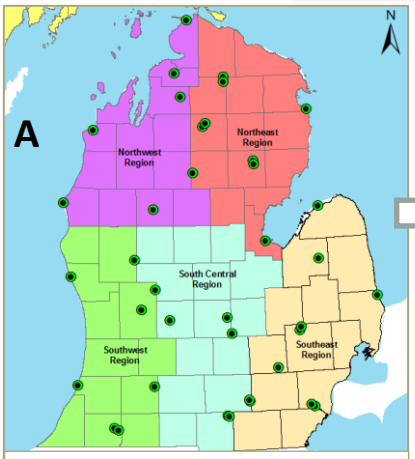
The local health department and the Michigan Department of Community Health plan to conduct follow-up ecologic investigations.



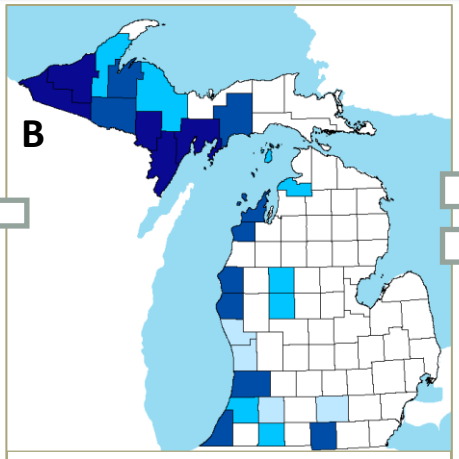
Above: Intracellular morulae of *E. muris*-like. Published in: Pritt *et al*. N Engl J Med. 2011 August 4; 365(5): 422–429. **Below:** *Ixodes scapularis* nymph on a human fingernail. Photo: Graham Hickling

Field Surveys and Risk Determinations

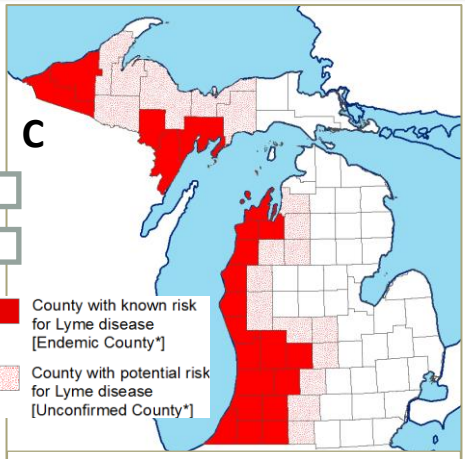
Field surveys are planned for 2014 to determine the entomological risk index (ERI) for Lyme and other tick-borne diseases at sites within and outside of Michigan's known blacklegged tick endemic regions. The ERI is the number of infected ticks a person would encounter over 1000m^2. This field survey information (A below) is combined with reports of confirmed human cases of Lyme disease (B below), and investigations into human Lyme disease case exposure to ticks locally, to create the Michigan Lyme Disease Risk Map (C below).



Information regarding blacklegged tick collections from the environment…..



….is combined with information regarding multiple LOCAL exposures to Lyme disease….



….to create Michigan's Lyme disease risk map.

What Can Be Done?

Public Health Agencies can

- Monitor Michigan's tick populations
- Maintain Lyme disease surveillance system
- Offer tick identification and testing services to the public
- Make Michigan data publicly available
- Promote tick-borne disease prevention guidance

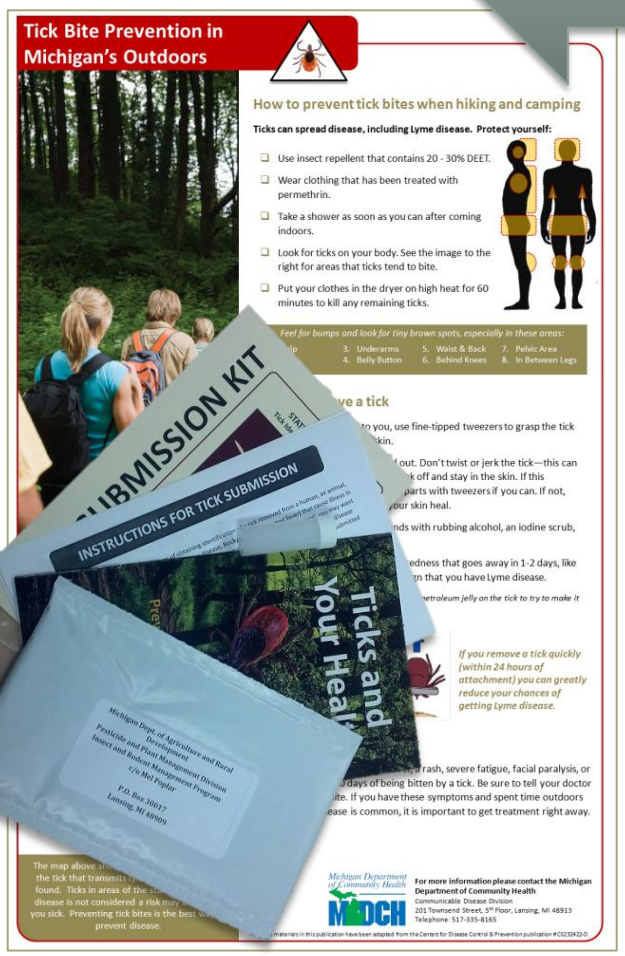
Health Providers can

- Review public health data regarding the risk of Lyme disease in Michigan
- Diagnose and treat infections using best practices
- Report cases promptly to your local health department
- Remind patients about the risk of Lyme disease in your area, and ways to prevent infections

Everyone can

- **Inform** yourself about where ticks can be encountered in Michigan
- **Prevent** tick bites by taking precautions and using EPA approved repellents on skin and clothing
- **Check** yourself and others for ticks regularly after spending time outdoors
- **Remove** ticks promptly and safely if you have been bitten
- **Submit** ticks you find on yourself or your pets for identification
- **Recognize** the symptoms of Lyme disease
- **Seek** prompt medical care if illness occurs after exposure to ticks

Tick Submission Kit and New Posters



As part of an effort to streamline public tick submission and testing, MDCH has developed a kit for submitting ticks to the State of Michigan. The kit consists of a screw cap plastic vial, a self-addressed, padded return envelope, a submission form, instructions for submission, and the Ticks and Your Health brochure.

MDCH has also created 11x17 full-color, glossy educational posters promoting tick bite prevention in Michigan's outdoors and Lyme disease prevention in children. Both the kit and posters are available to local health departments, healthcare facilities, and veterinary clinics, and can be ordered via the Communicable Disease Division's publication order form at: www.michigan.gov/cdinfo

Learn More

MDCH Lyme disease Website:
http://www.michigan.gov/lymedisease

Centers for Disease Control and Prevention Lyme disease Website:
http://www.cdc.gov/lyme

Tickborne Diseases of the United States:
A reference manual for health care providers:
http://www.cdc.gov/lyme/resources/TickborneDiseases.pdf

MDCH "Ticks and Your Health" Brochure:
http://michigan.gov/documents/emergingdiseases/resize_307382_7.pdf